

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
7 July 2005 (07.07.2005)

PCT

(10) International Publication Number
WO 2005/062683 A3

(51) International Patent Classification⁷: **H05B 41/38**

(21) International Application Number:
PCT/GB2004/005413

(22) International Filing Date:
24 December 2004 (24.12.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0330019.1 24 December 2003 (24.12.2003) GB

(71) Applicant and

(72) Inventor: **POWELL, David, John** [GB/GB]; 33 Fishpond Lane, Egginton, Derby Derbyshire DE65 6JH (GB).

(74) Agents: **HACKNEY, Nigel** et al.; Mewburn Ellis LLP, York House, 23 Kingsway, London Greater London WC2B 6HP (GB).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

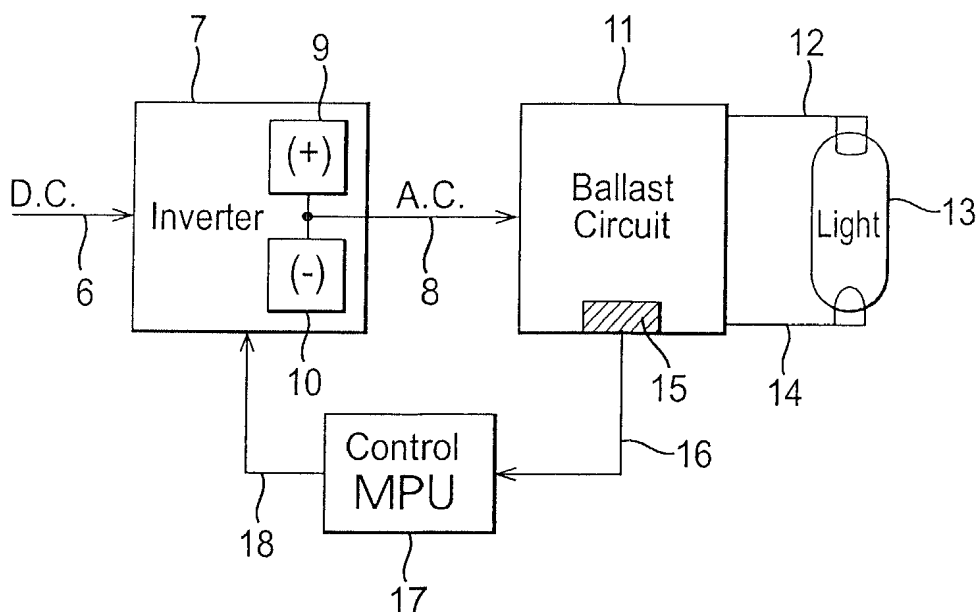
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: APPARATUS AND METHOD FOR CONTROLLING DISCHARGE LIGHTS



(57) Abstract: Apparatus and method for supplying AC power (e.g. from an inverter) to a discharge light via a ballast circuit formed by a resonant circuit, and controlling the frequency of the AC power signal so as to operate below the natural resonance frequency of the ballast circuit in use after the discharge light has "struck".



WO 2005/062683 A3



(88) Date of publication of the international search report:

18 August 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB2004/005413

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H05B41/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 611 021 A (KENNETH A. WALLACE) 5 October 1971 (1971-10-05) column 4, line 15 - column 4, line 73; figures 1-3 -----	1-9, 11, 14, 16-20, 22-27, 31, 32
A	US 5 691 607 A (ZAWISLAK ET AL) 25 November 1997 (1997-11-25) column 2, line 34 - column 3, line 64; figures 1, 2 -----	8, 14, 19, 29
X	GB 2 279 187 A (* THORN LIGHTING LIMITED) 21 December 1994 (1994-12-21) page 1, line 14 - page 5, line 8; figures 1-3 ----- -/--	1, 2, 16, 17

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

31 March 2005

Date of mailing of the international search report

10.06.2005

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Albertsson, E

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB2004/005413

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 926 928 A (TOSHIBA LIGHTING & TECHNOLOGY CORPORATION; TOSHIBA LIGHTING & TECHNOLO) 30 June 1999 (1999-06-30) column 3, paragraph 15 - column 24, paragraph 132; figures 1-24 -----	1,2,16, 17
A	US 5 525 870 A (MATSUZAWA ET AL) 11 June 1996 (1996-06-11) -----	
A	US 5 563 473 A (MATTAS ET AL) 8 October 1996 (1996-10-08) -----	
A	US 5 844 380 A (SIEPKES ET AL) 1 December 1998 (1998-12-01) -----	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2004/005413

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-32

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-32

A method for controlling the power fed to a discharge lamp by AC power via a ballast circuit resonating at a predetermined value of the frequency of said AC power, the method including:
maintaining the frequency of said AC power to be always under said predetermined value after the discharge lamp has struck.

2. claims: 33-45

A method for controlling the power delivered to a discharge lamp from a source of DC power, the power being delivered via an inverter and a ballast circuit as AC power, the method including:
monitoring variations in the DC power input to the inverter and varying the frequency of the AC power according to detected variations in the DC power input, such as to control variations in the power supplied to the discharge lamp via the ballast circuit.

3. claims: 46-49

A method for controlling the power fed to a discharge lamp by AC power via a ballast circuit, the method including:
monitoring the ambient illumination level in the vicinity of the lamp and adjusting the frequency of said AC power to adjust the power delivered to and ultimately radiated by the discharge lamp, thereby to maintain the ambient light illumination level at a substantially constant value.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB2004/005413

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3611021	A	05-10-1971	NONE	
US 5691607	A	25-11-1997	DE 69715447 D1	17-10-2002
			DE 69715447 T2	27-02-2003
			EP 0943123 A1	22-09-1999
			ES 2181008 T3	16-02-2003
			WO 9741497 A1	06-11-1997
GB 2279187	A	21-12-1994	NONE	
EP 0926928	A	30-06-1999	JP 10294194 A	04-11-1998
			JP 10294193 A	04-11-1998
			DE 69828484 D1	10-02-2005
			EP 0926928 A1	30-06-1999
			HK 1022590 A1	24-03-2005
			US 6177768 B1	23-01-2001
			CN 1229568 A ,C	22-09-1999
			WO 9847323 A1	22-10-1998
			KR 2000016745 A	25-03-2000
US 5525870	A	11-06-1996	JP 3026681 B2	27-03-2000
			JP 6020780 A	28-01-1994
			CN 1082304 A	16-02-1994
			DE 69327426 D1	03-02-2000
			DE 69327426 T2	03-08-2000
			EP 0576991 A2	05-01-1994
			ES 2141121 T3	16-03-2000
			KR 9702289 B1	27-02-1997
US 5563473	A	08-10-1996	US 5463284 A	31-10-1995
			AT 234541 T	15-03-2003
			CA 2196573 A1	05-12-1996
			CN 1159279 A ,C	10-09-1997
			DE 69626603 D1	17-04-2003
			DE 69626603 T2	18-12-2003
			EP 0774199 A1	21-05-1997
			WO 9639010 A1	05-12-1996
			JP 10503881 T	07-04-1998
			US 5686798 A	11-11-1997
			AT 147925 T	15-02-1997
			CA 2104252 A1	21-02-1994
			DE 69307427 D1	27-02-1997
			DE 69307427 T2	17-07-1997
			EP 0583838 A2	23-02-1994
			ES 2099369 T3	16-05-1997
			FI 933626 A	21-02-1994
			JP 6176881 A	24-06-1994
			MX 9305064 A1	30-06-1994
			SG 48129 A1	17-04-1998
			TW 394493 Y	11-06-2000
US 5844380	A	01-12-1998	CN 1193451 A ,C	16-09-1998
			DE 69709604 D1	21-02-2002
			DE 69709604 T2	05-09-2002
			EP 0838128 A1	29-04-1998
			WO 9743877 A1	20-11-1997
			JP 11509963 T	31-08-1999